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The Role of Metals in the Reaction Catalyzed by Metal-Ion-Independent Bacillary RNase

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Abstract

© 2016 Yulia Sokurenko et al.Extracellular enzymes of intestinal microbiota are the key agents that affect functional activity of the body as they directly interact with epithelial and immune cells. Several species of the Bacillus genus, like Bacillus pumilus, a common producer of extracellular RNase binase, can populate the intestinal microbiome as a colonizing organism. Without involving metal ions as cofactors, binase depolymerizes RNA by cleaving the 3′,5′-phosphodiester bond and generates 2′,3′-cyclic guanosine phosphates in the first stage of a catalytic reaction. Maintained in the reaction mixture for more than one hour, such messengers can affect the human intestinal microflora and the human body. In the present study, we found that the rate of 2′,3′-cGMP was growing in the presence of transition metals that stabilized the RNA structure. At the same time, transition metal ions only marginally reduced the amount of 2′,3′-cGMP, blocking binase recognition sites of guanine at N7 of nucleophilic purine bases.

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